

# Benzie-Leelanau District Health Department

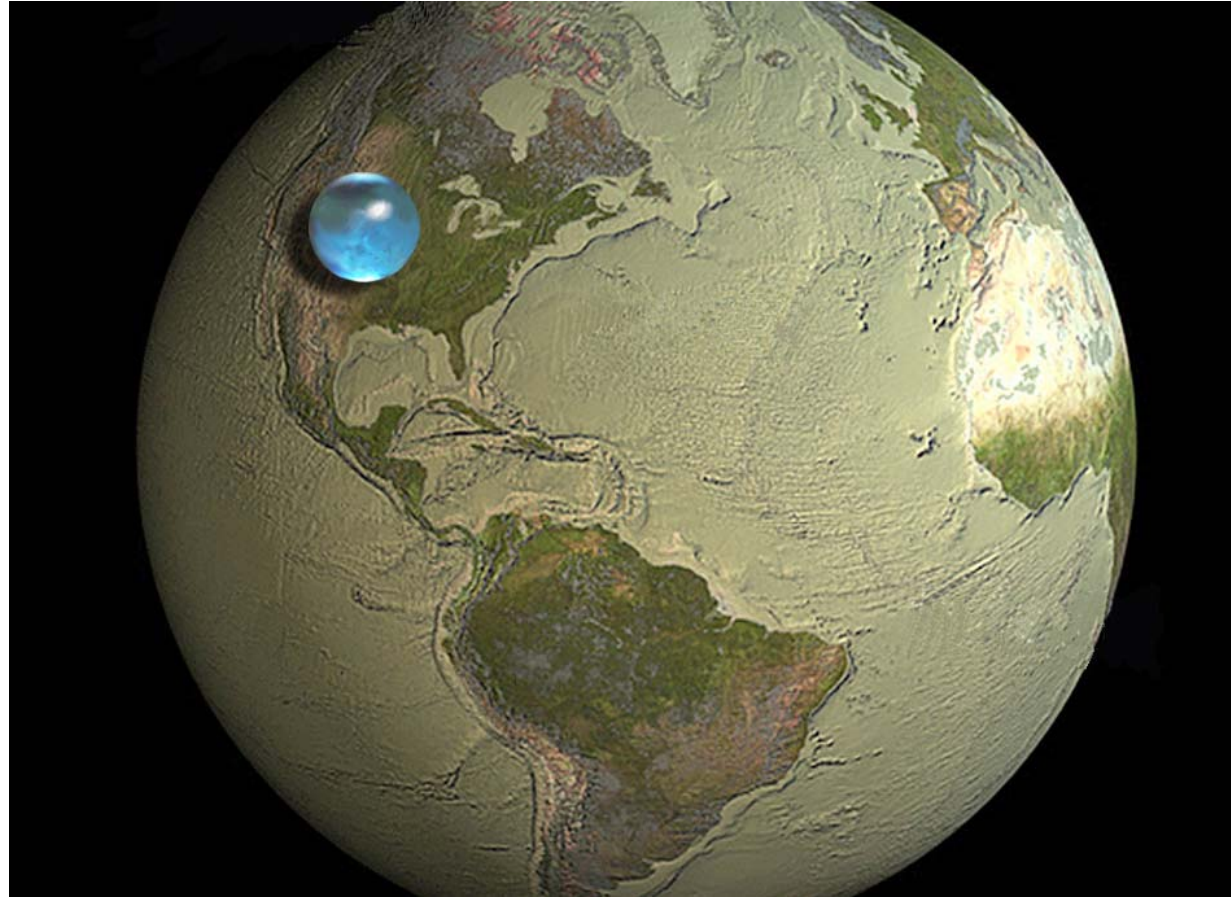


# Benzie-Leelanau District Health Department

- Tri-county Health Dept. Until 1990.
- G.T. County H.D. contract until 1996.
- Environmental Health regulations adopted in 1972 requiring sewage disposal and water well permits.
- 48 inch isolation distance to groundwater established at that time.
- Board of Health approval of holding tanks due to pressure to build in unsuitable locations.

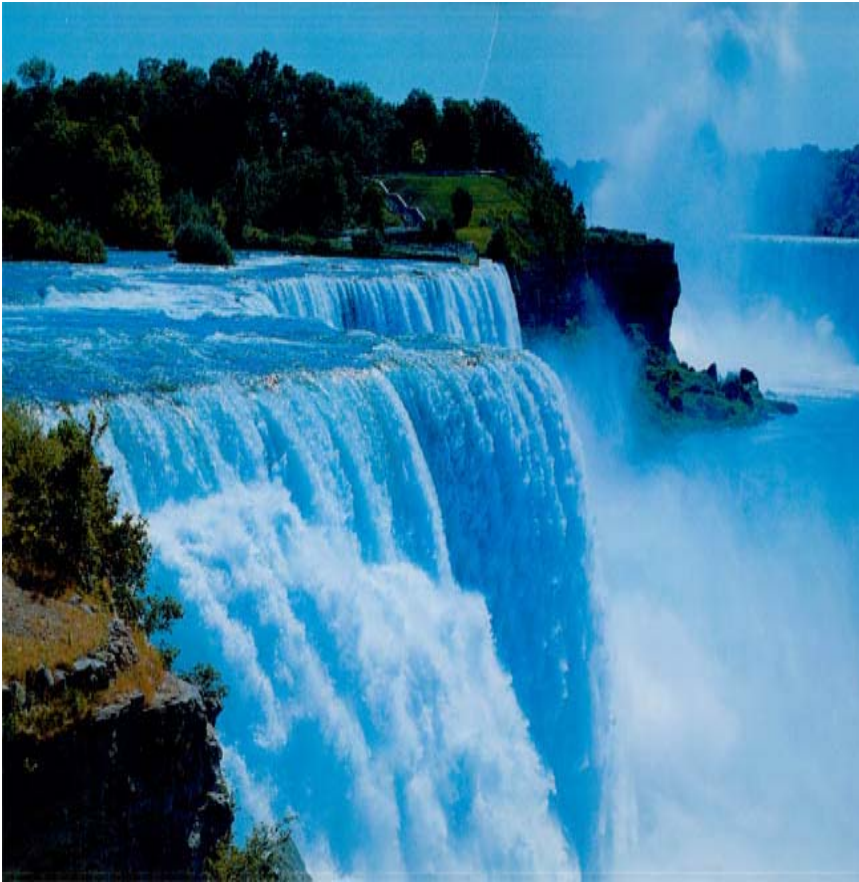
# Sanitary Code

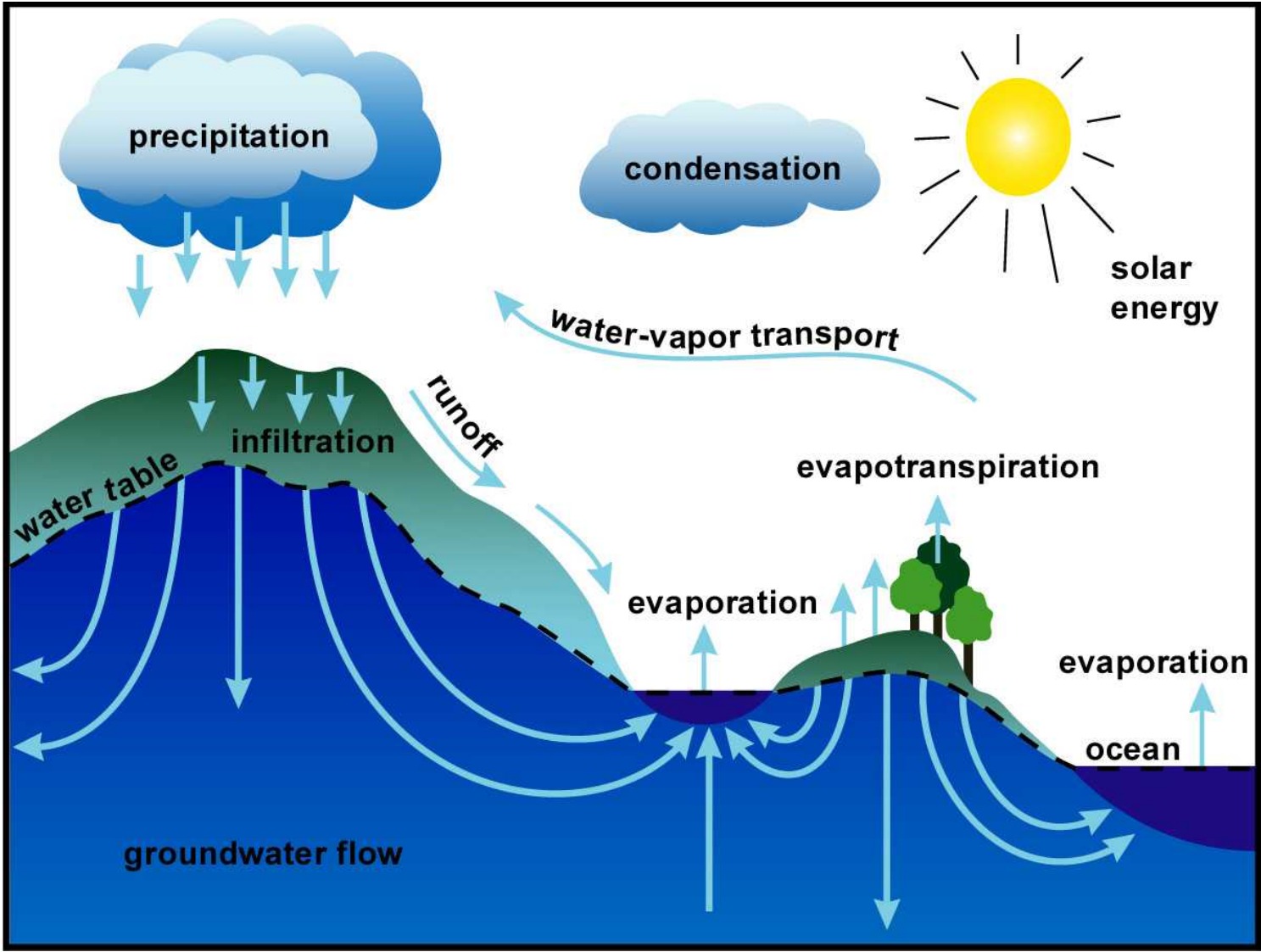
- Drainfield 48 inches to water table.
- Tank and field 50 feet from well.
- Tank and field 50 from surface H<sub>2</sub>O.
- Bedrooms determine size of system.
- Garbage disposal increases tank size.
- Soil type and texture...Permeability.
- Percolation Rate < 45 min. per inch.
- Inadequate space...lot too small.



**This sphere measuring 860 miles in diameter represents all of Earth's water.**

# Every Drop Counts





The Water Cycle

# WATER FACTS

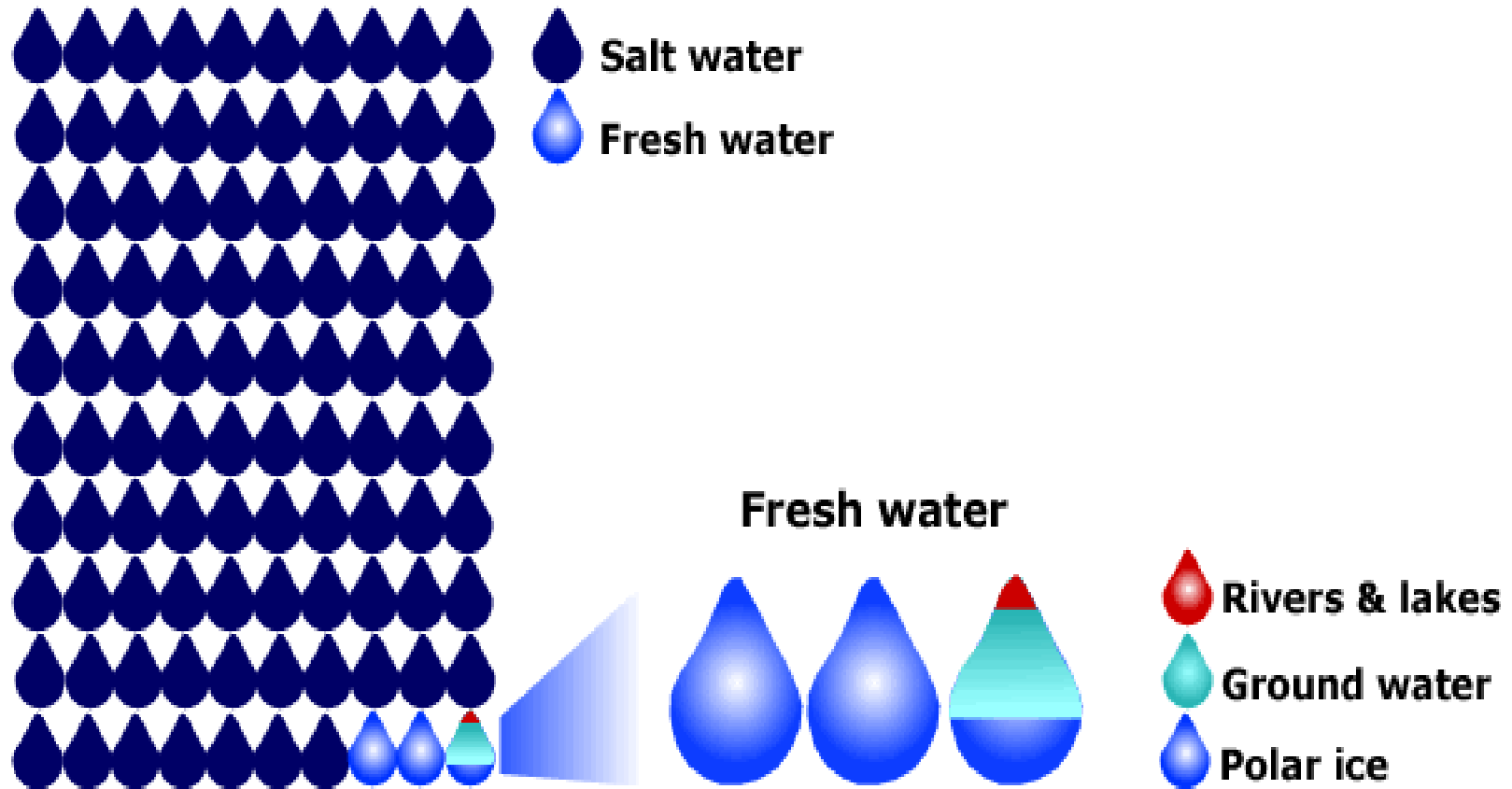


# WATER FACTS

- A typical cumulus cloud measuring 1Km x 1Km weighs 1.1 million pounds!
- 71% of Earth is water covered!
- The oceans hold 96.5 % of all water!
- USA Uses 410 billion gallons per day!
- Groundwater equals 1.69% of all water!
- Lakes contain 0.013% of all water!
- A drop of water spends 8 days in the atmosphere and 3000 yrs. in the ocean!



# All the Water in the World



There is a very small amount of the Earth's water that is drinkable (less than 1%), so we have to try very hard keep it clean!

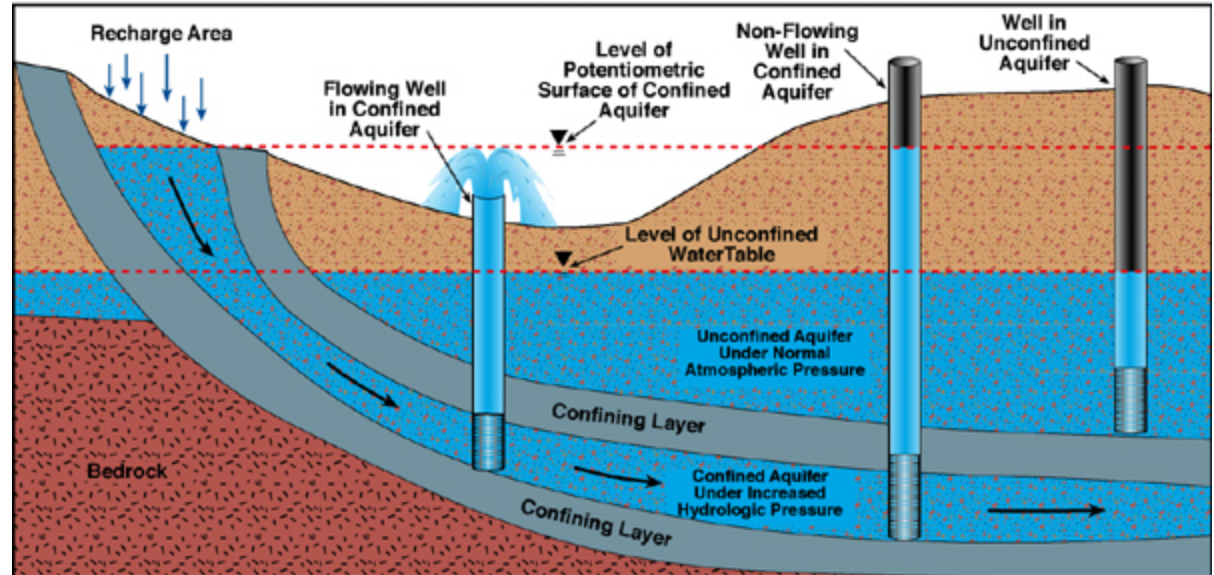
- What am I?



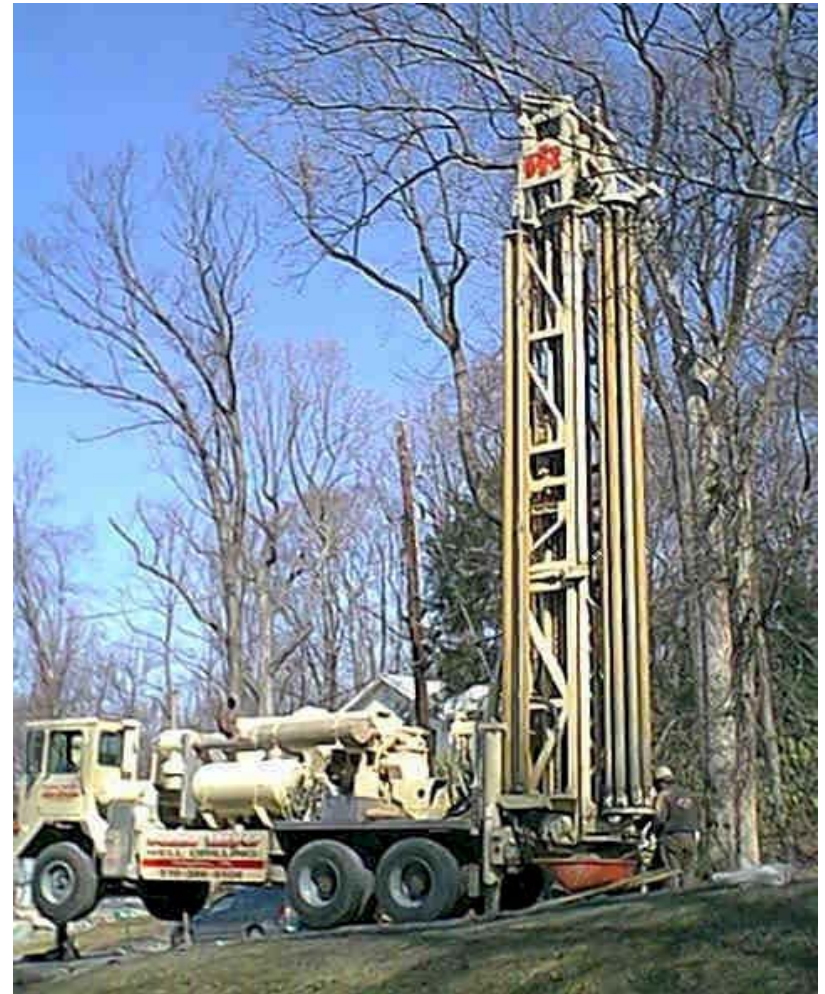
# 2 Common Types of Wells



Potentiometric Surface and Flowing Wells

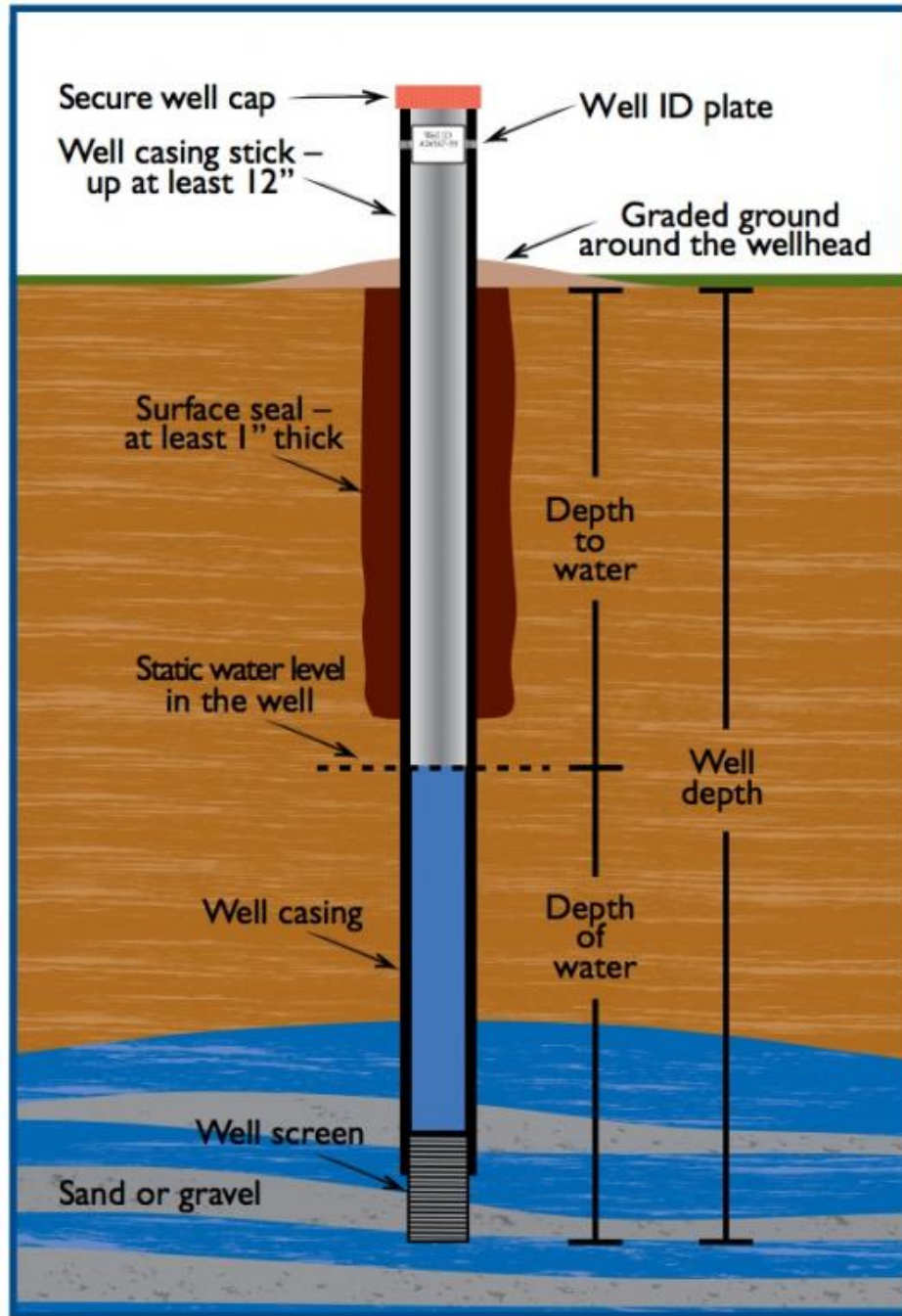


# Water Wells: How Are They Made?

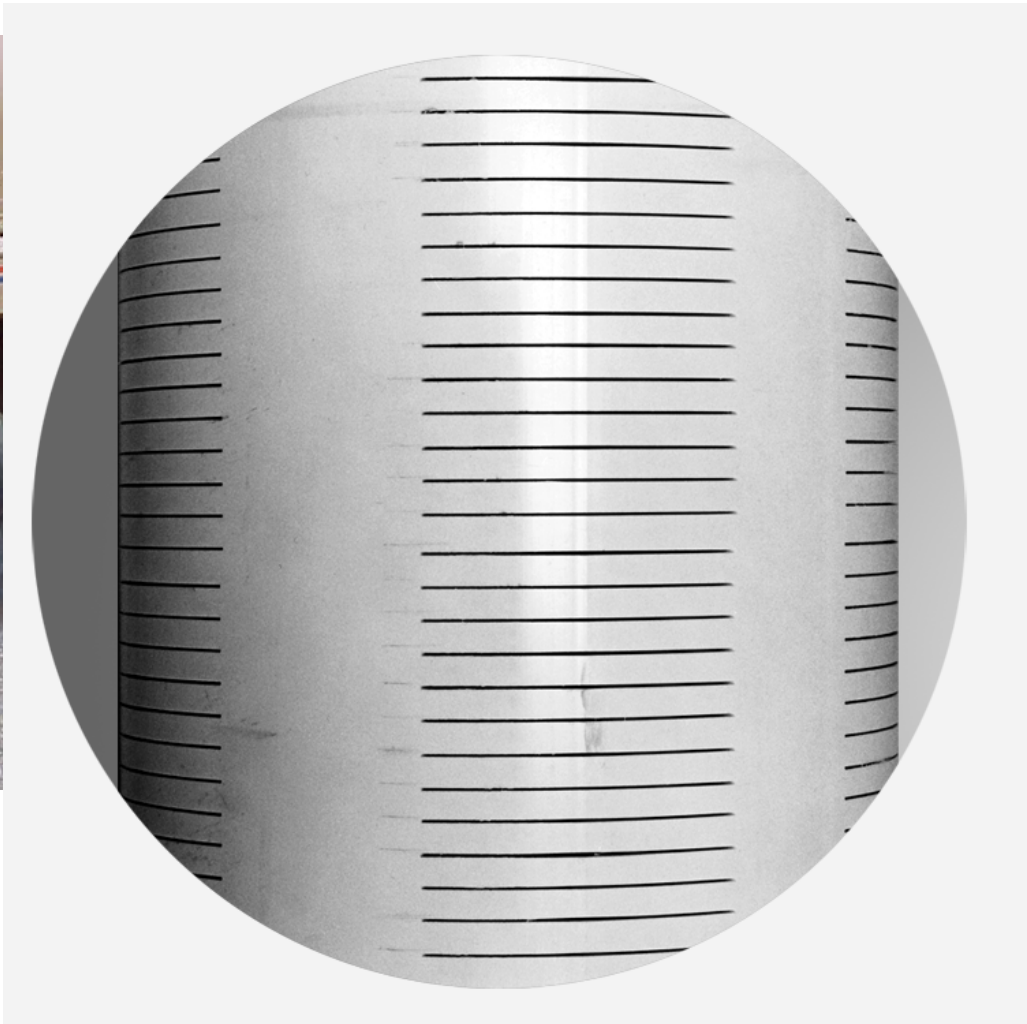


# Water Wells: How They Work

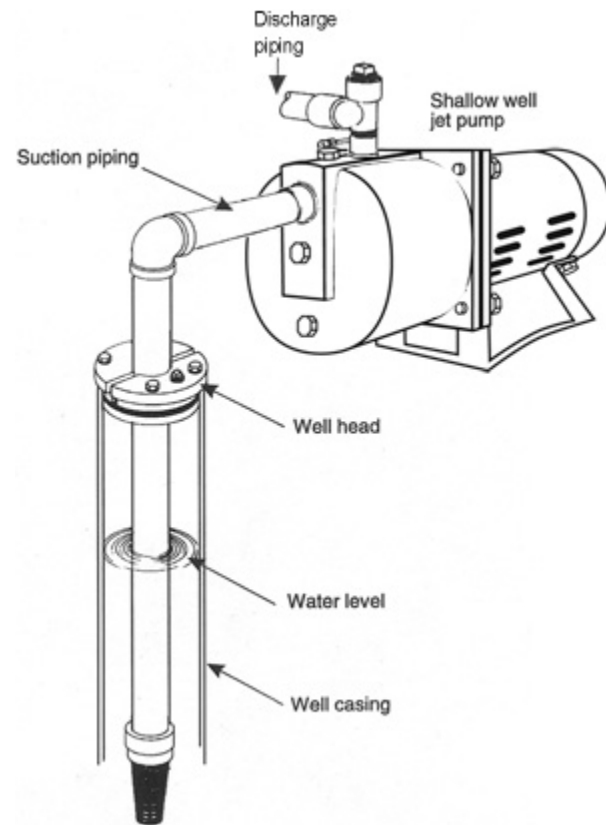




# Water Wells: How They Work

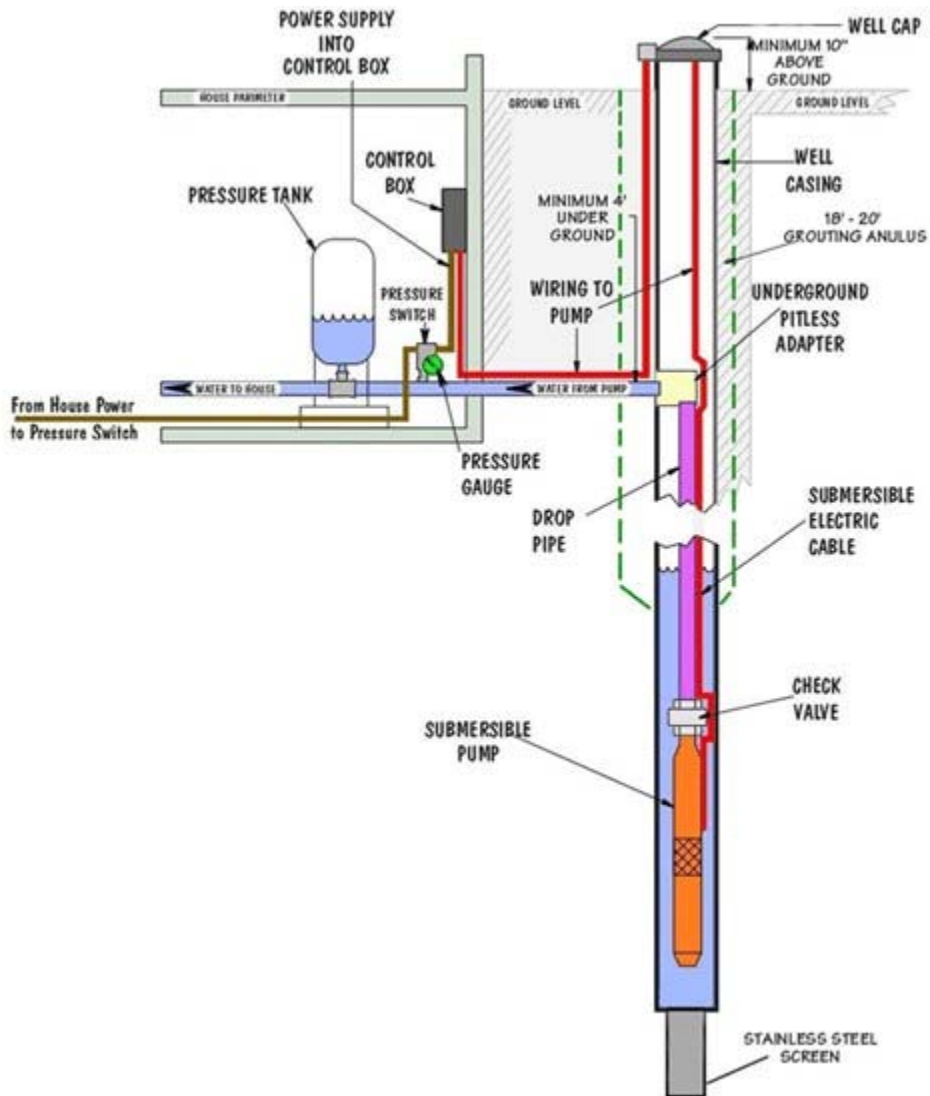


# Water Wells: How They Work





# Water Wells: How They Work



# What happens to the water we use? Where does it go?



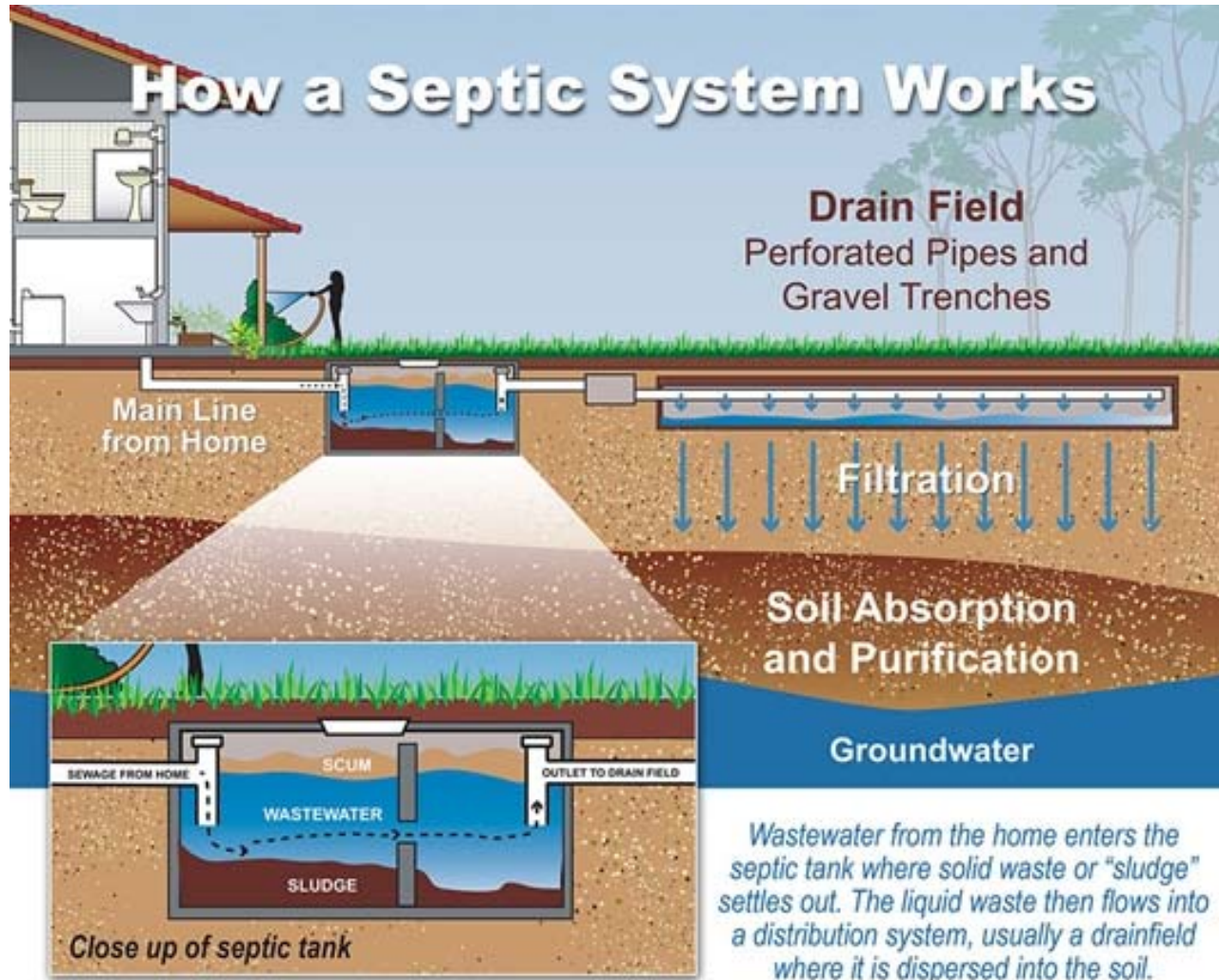
Sewage Treatment Plant if you live in the city.



# Your Backyard if You live in Rural America



# Septic Systems:



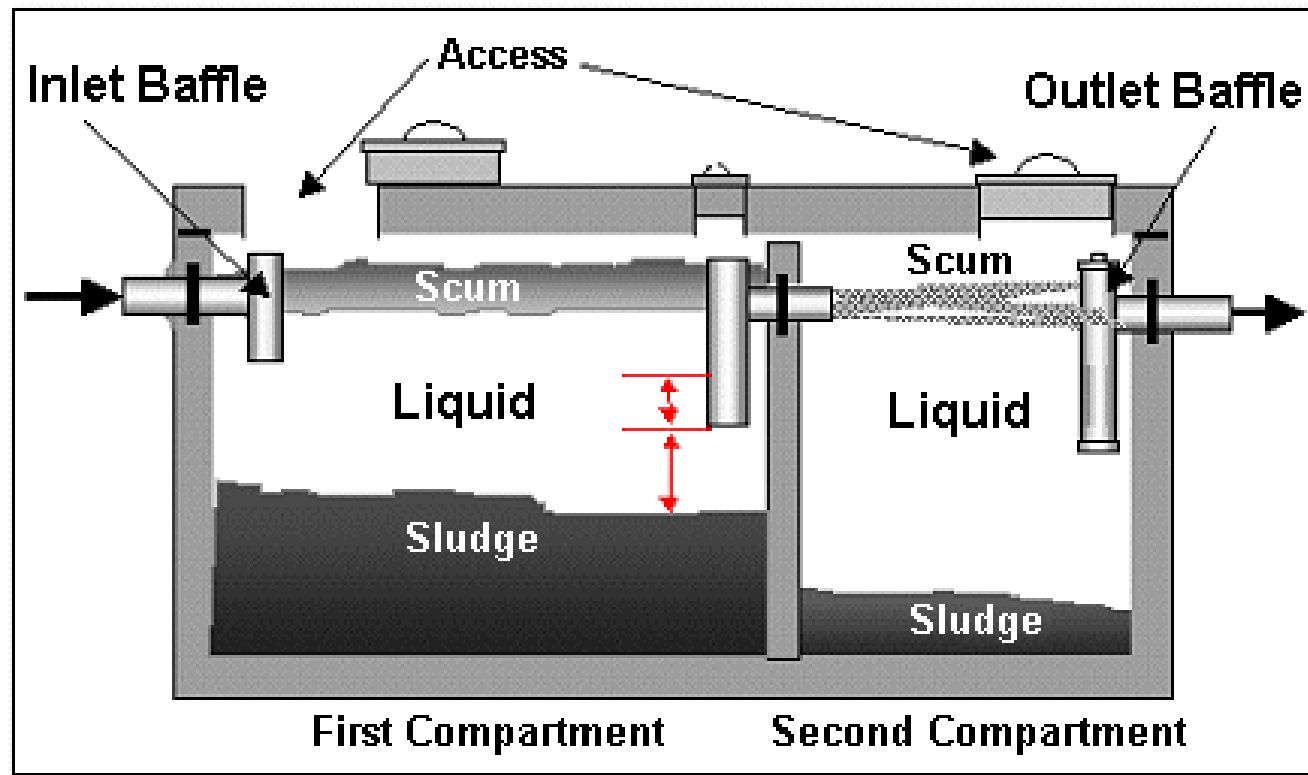
# Septic Systems: How They Work

- Flush to Septic Tank



# Septic Systems: How They Work

- Inside the tank



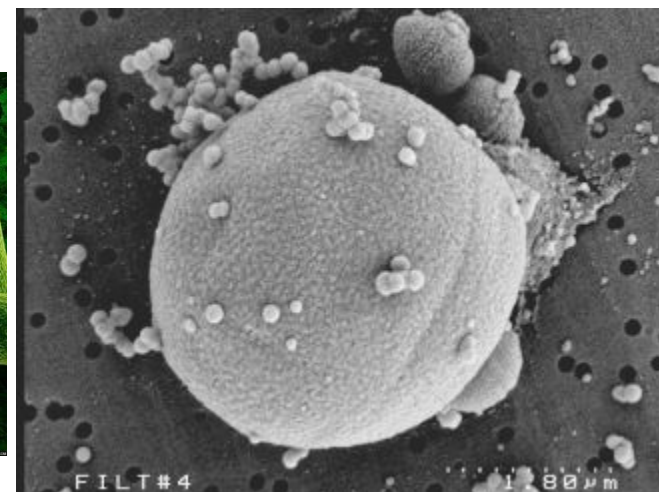
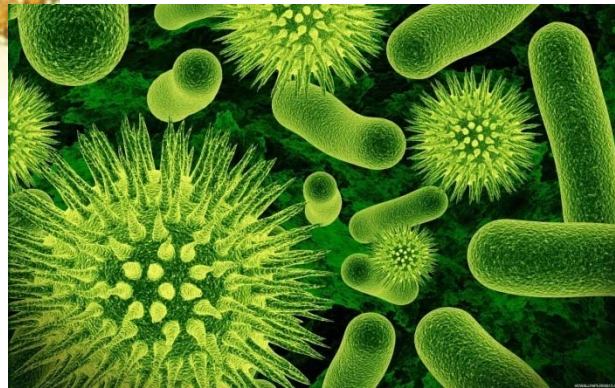
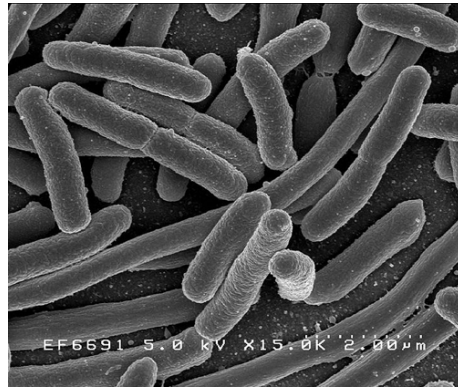
# Septic Systems: How They Work

Organism	Concentration MPN/100ml	Infectious dose MPN/100ml
Bacteria		
Coliform, fecal	$10^6$ - $10^8$	$10^6$ - $10^{10}$
<i>Shigella</i>	$10^0$ - $10^2$	10-20
<i>Salmonella</i>	$10^2$ - $10^4$	N/A
Protozoa		
<i>Cryptosporidium</i>	10- $10^3$	1-10
<i>Parvuum oocyst</i>	$10^3$ - $10^4$	<20
<i>Giardia lamblia</i> cysts		
Helminths		
Ova	10- $10^3$	N/A
<i>Ascaris lumbricoides</i>	N/A	1- 10
Viruses		
Enteric virus	$10^3$ - $10^4$	1-10
Coliphage	$10^3$ - $10^4$	N/A



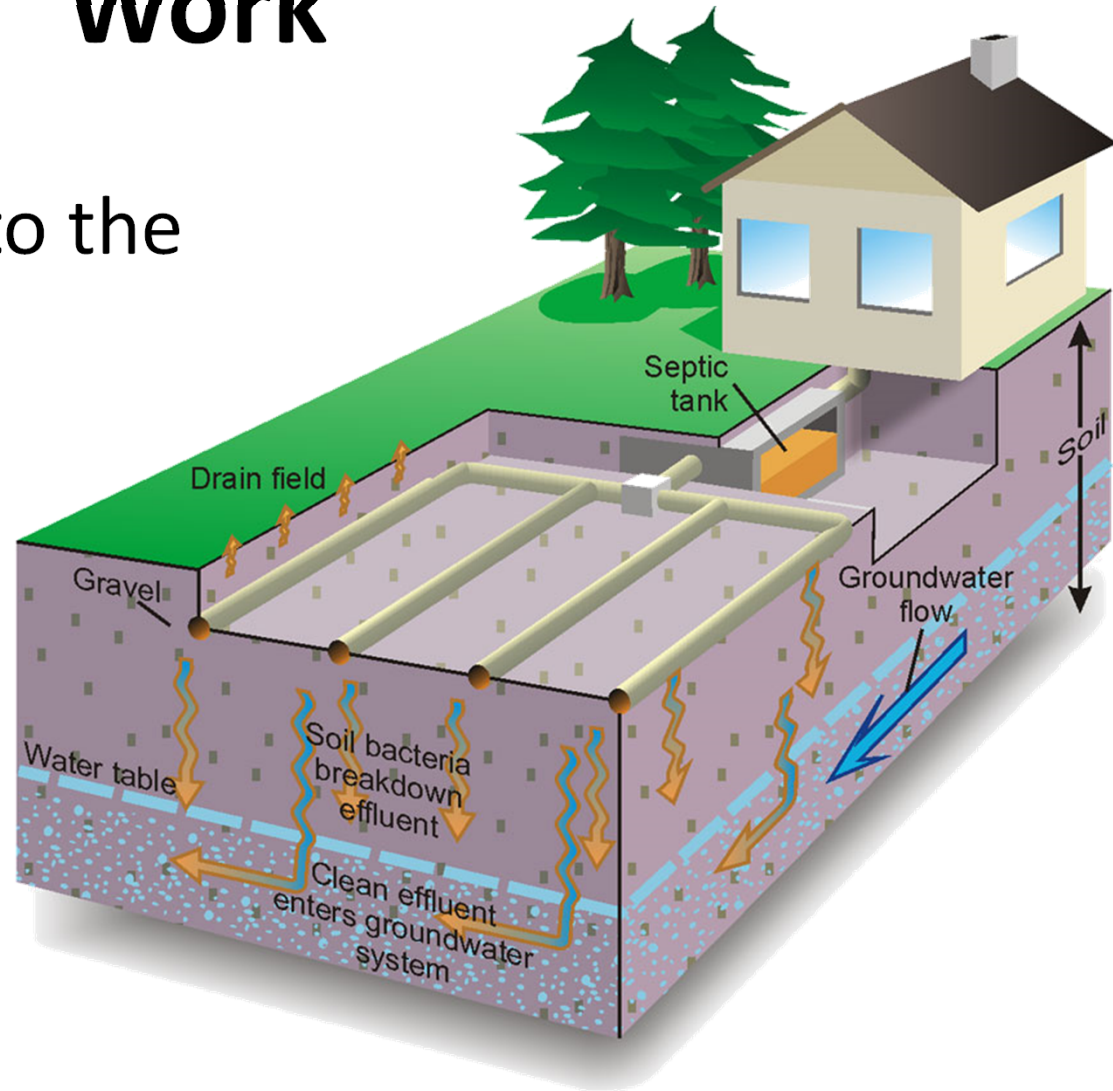
# Septic Systems: How They Work

- Living in the tank



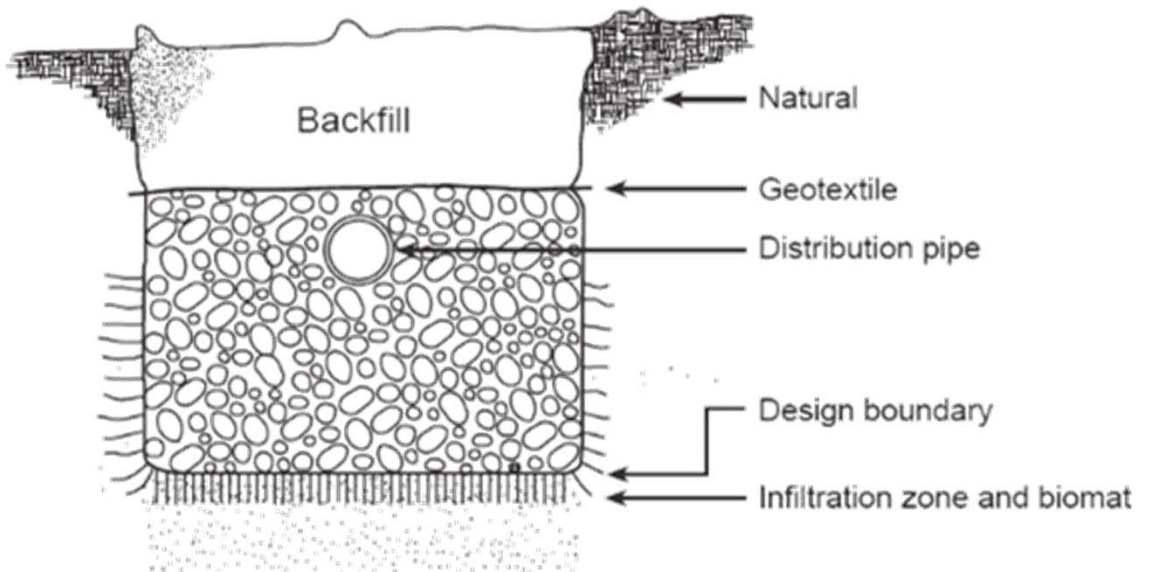
# Septic Systems: How They Work

- Septic Tank to the Drain Field



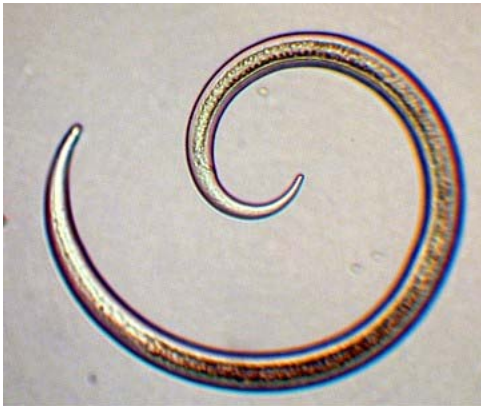
# Septic Systems: How They Work

- Drain field construction

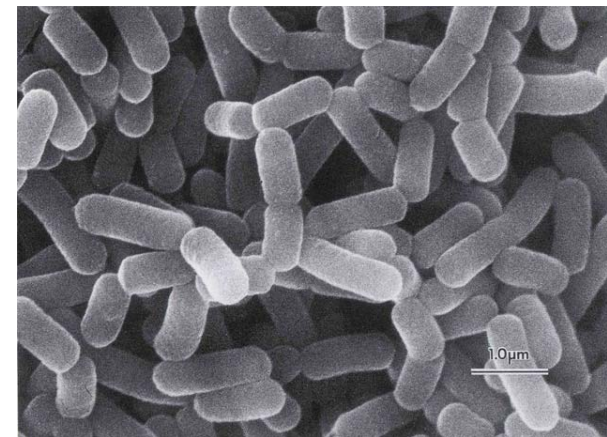


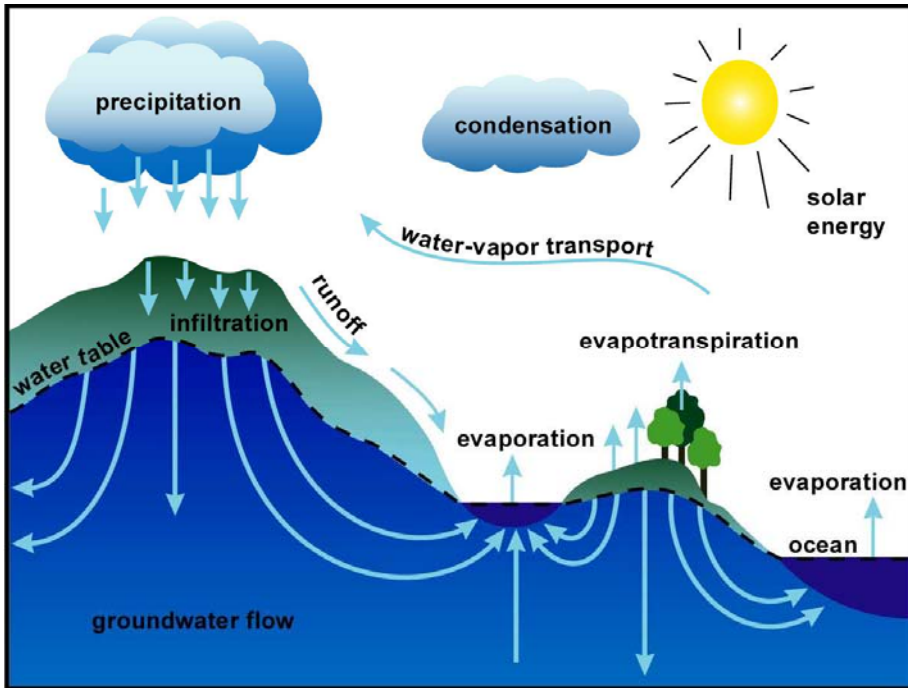
# Septic Systems: How They Work

- Living in, on, & under the drainbed

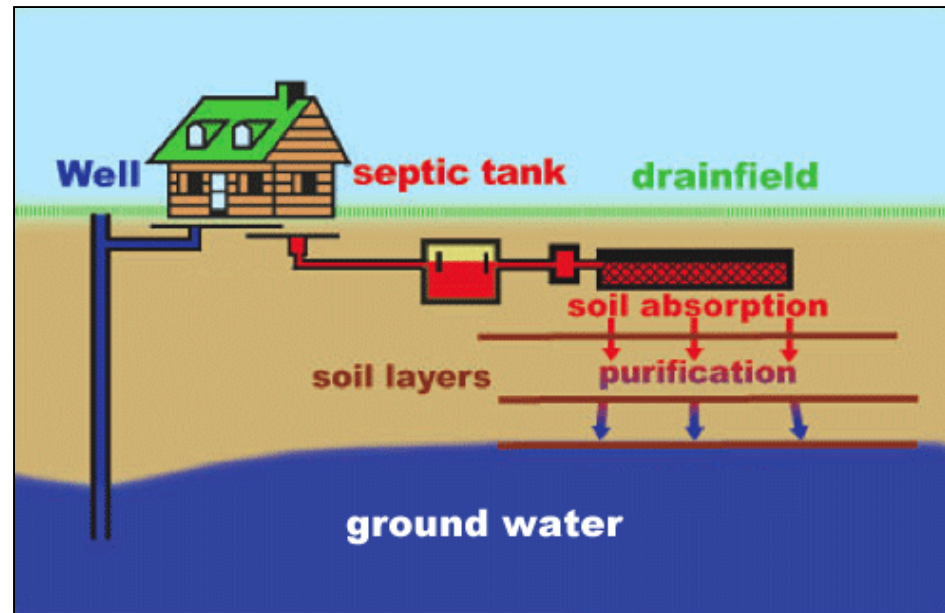


Aerobic Bacteria  
Nematodes  
Earthworms  
Grass  
Plus Much More



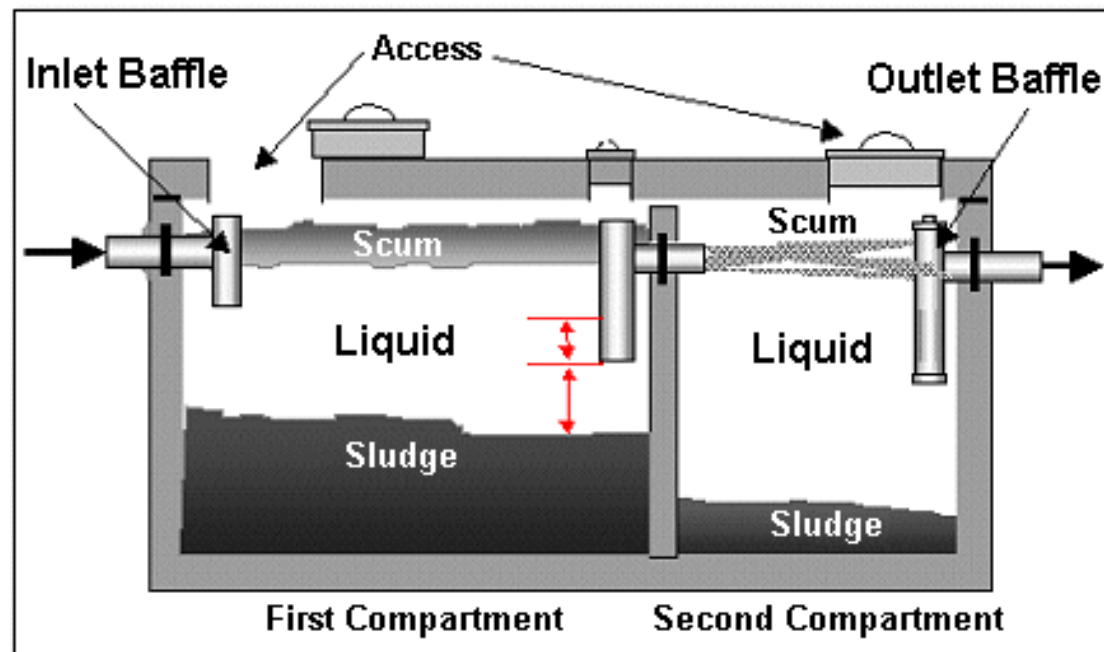


## The Water Cycle



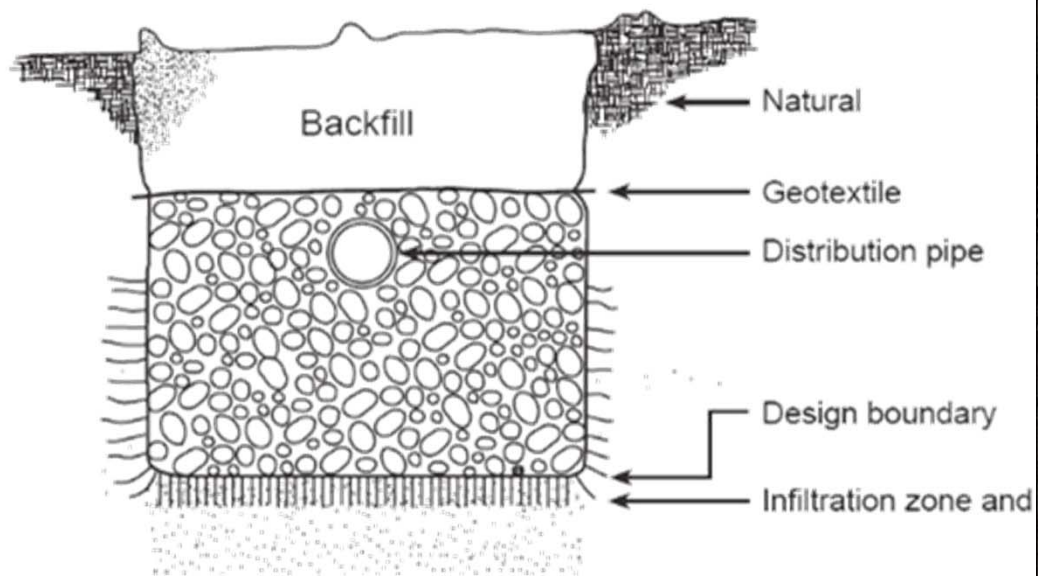
# Septic Systems: Will they work forever?

- Inside the tank



# Septic Systems: Will they work forever?

- Drain field construction



I NEVER had to pump my tank!





# Septic Systems: When They Go Bad



# Or REAL Bad



# Septic Systems: Maintenance

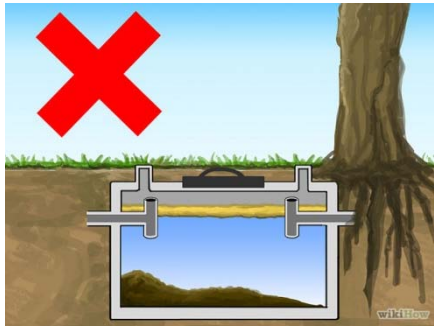
- Maintaining the system



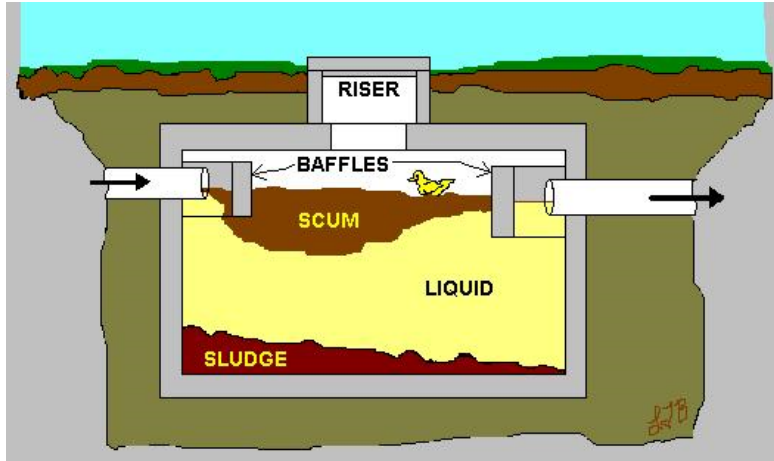
# Septic Tank Effluent Filters



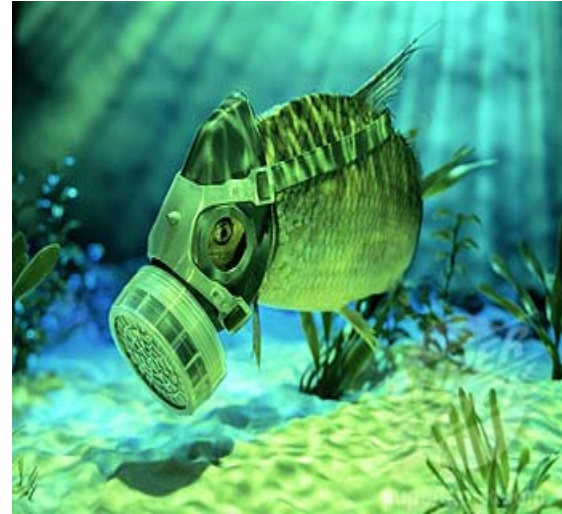
# My grandpa planted that tree!



# NEVER DUMP MEDICATIONS DOWN TOILET



## RESIDUAL MEDICATIONS AFFECT WILDLIFE and PEOPLE



# Don't even think about it!





# Spread Out Laundry Throughout the Week



electric washing machine with wringer, 1940s

# More is NOT Better.

**Bleach and detergents.**



**Easy does it or use dryer sheets.**



# Check for leaking plumbing and unnecessary connections to sewer.



One Drop every second equals  
2054 gallons per year.



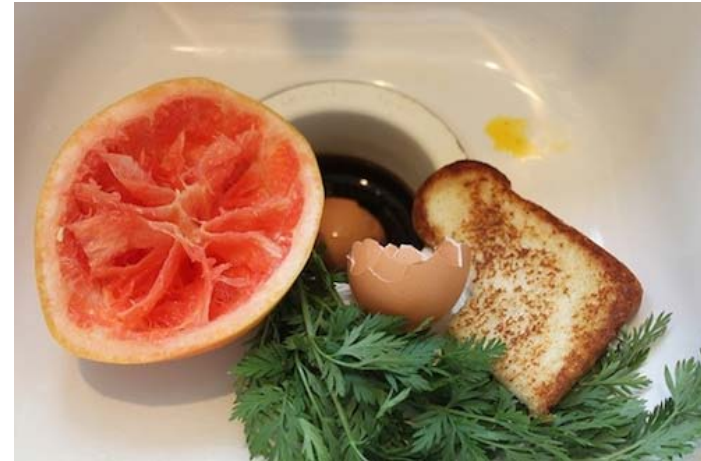
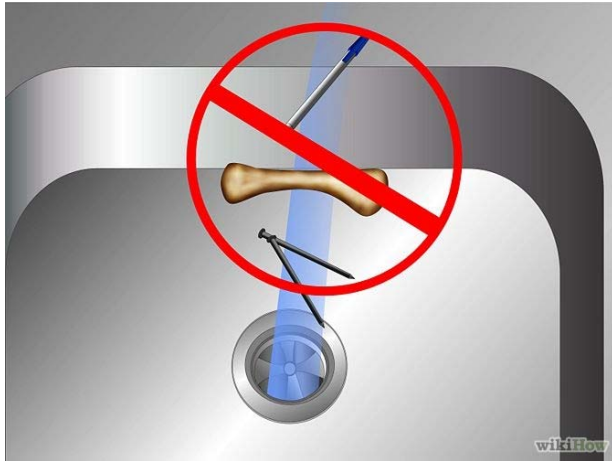


**Chemical and Biological additives are not recommended and in some cases have been banned due to groundwater contamination. These products are expensive and in most cases experts indicate little if any value to their use.**



**Use less toilet tissue. Non-quilted varieties break down quicker in the tank.**

# Know Your Options





**Pump your tank(s) every 3-4 years for your average home. Adjust as necessary.**



# Where do they take IT?

**Land Application Site**

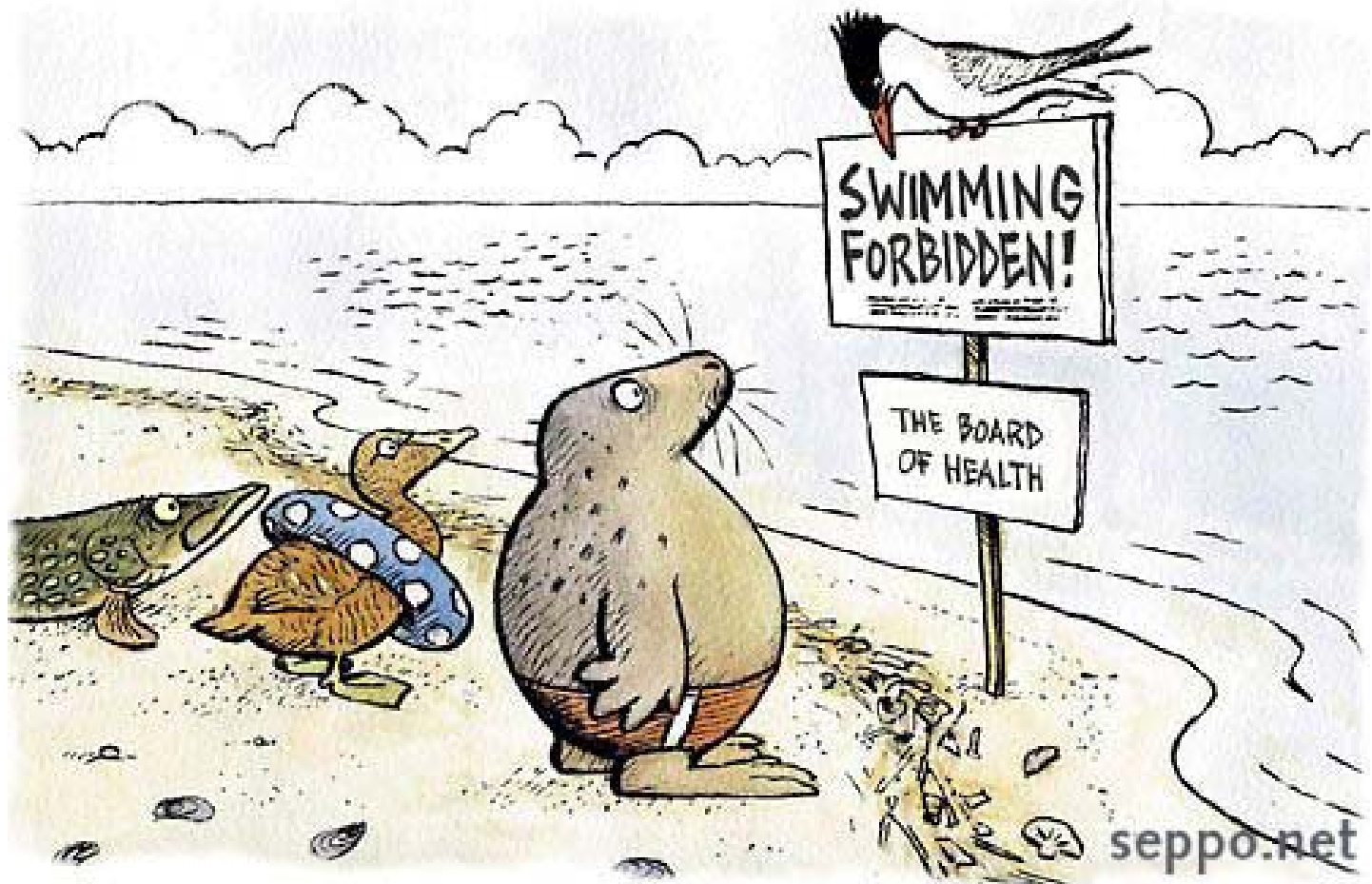


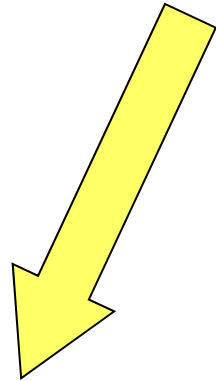
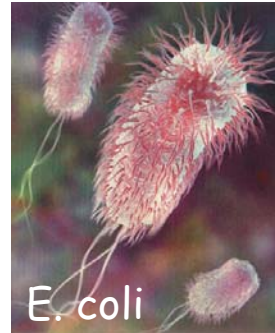
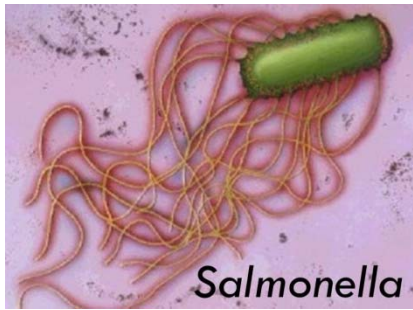
**Septage Receiving Facility  
Treatment Plant**



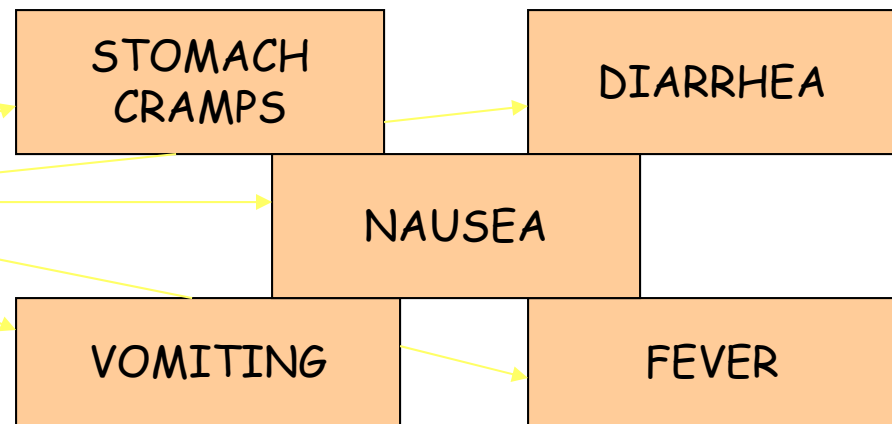
# What we have to Lose!

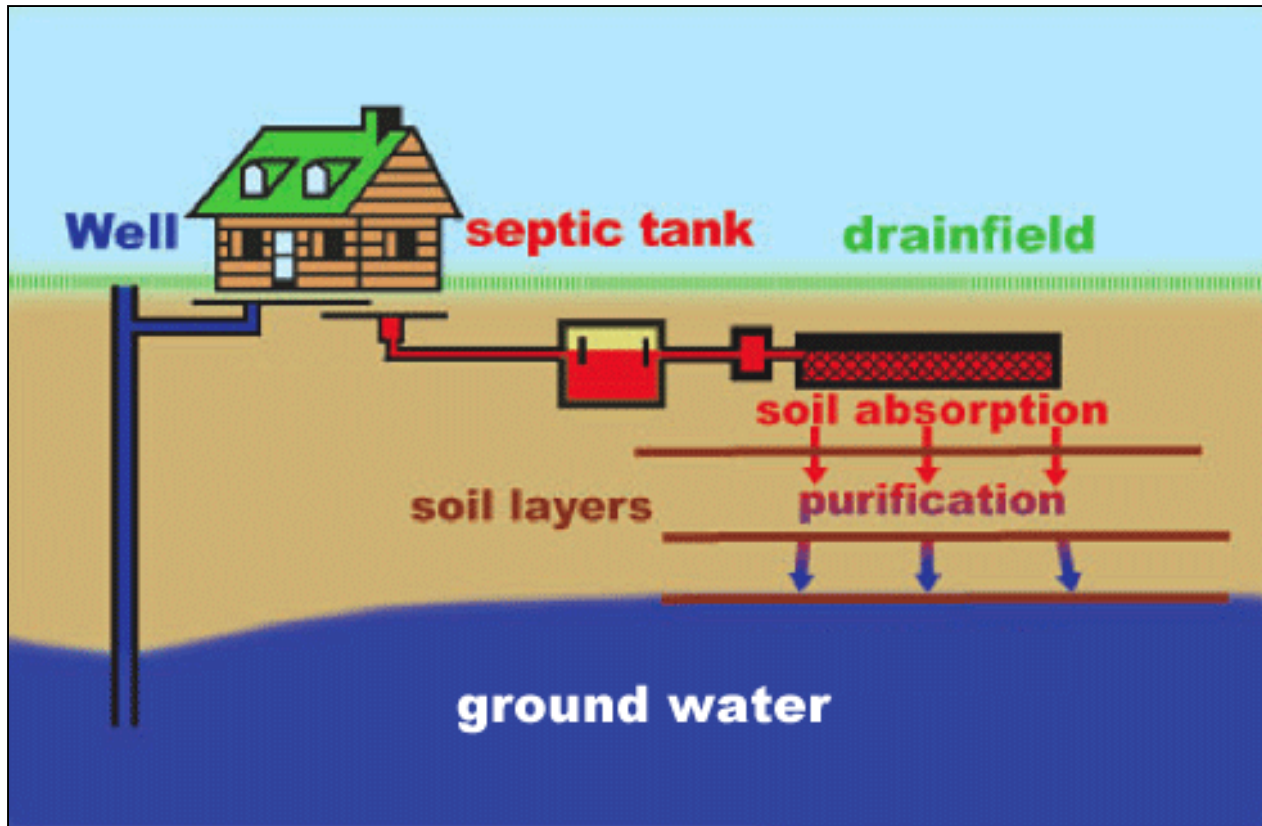




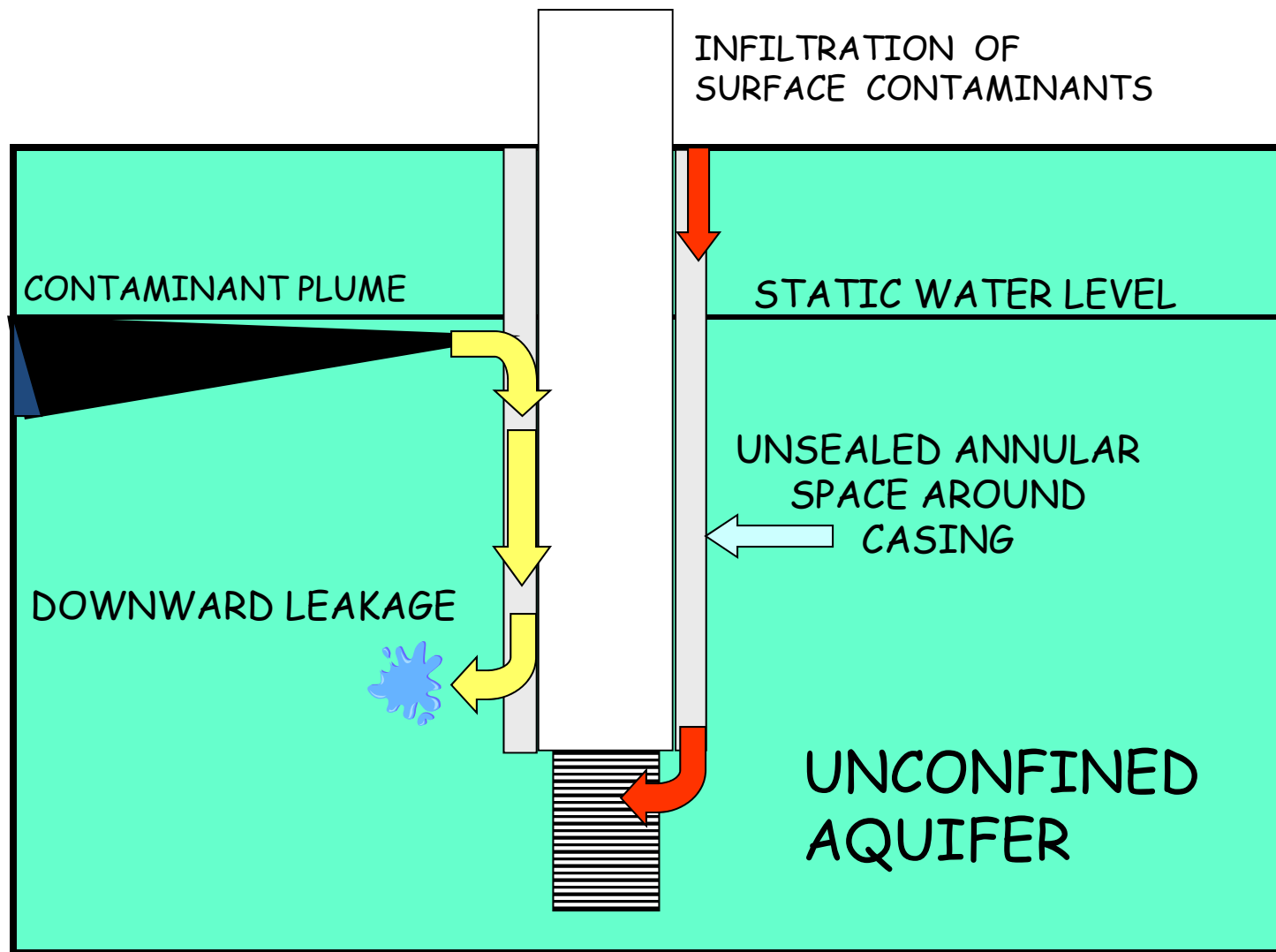


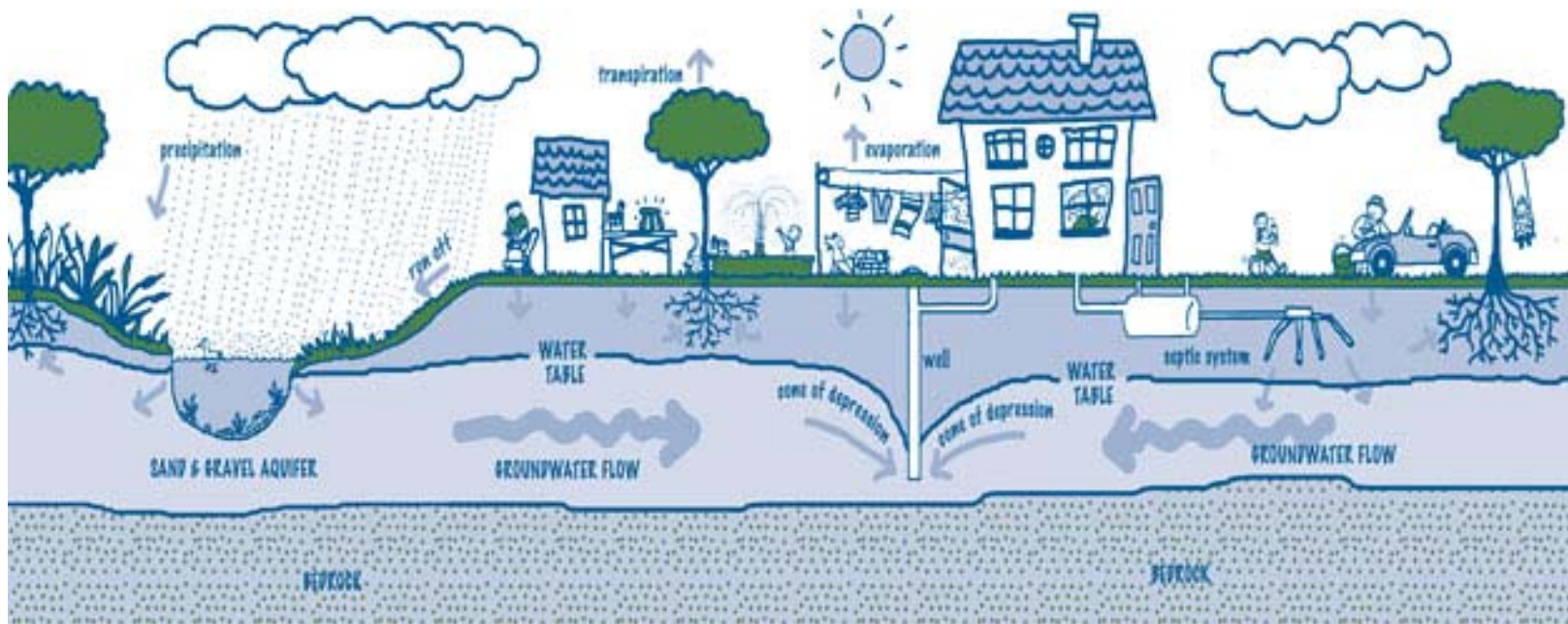
## ACUTE GASTROENTERITIS SYMPTOMS:





**The Water Cycle & Contaminants**





## The Water Cycle & Contaminants



Would this "well cap" and this well casing keep contaminants out of the well?





**This well cap (1-19-15) damaged by a garden tractor.  
Notice insect nests and gypsy moth egg cluster. Earwigs  
love living in your well**



**Another damaged well discovered during Point of Sale Inspection. (2-23-15)**



**Why do we require permits??? Feb.9,2015**



**Bathtub, sink, kitchen sink and laundry discharge  
to Betsie River. Feb.9, 2015.**



**Holding tank overflow (1-2-15). Sewage was found flooding street and icing up roadway. Notice dog tracks and human foot prints in slush.**

# Top ten do not flush list.

<b>1. Bathroom Wipes</b>	<b>6. Cigarette Butts</b>
2. Condoms	7. Band-aids
3. Cotton Balls & Swabs	8. Dental Floss
4. Prescription Medications	9. Fats, Oils and Grease
5. Paper towels	10. Cat litter



**And #11... Diapers.**

**THE END**



Questions???